

*REMARKS/ARGUMENTS*

In response to the Office Action mailed January 22, 2007, Applicants amend their application and request continued examination. In this Amendment claim 11 is added so that claims 1, 3, and 6-11 are now pending.

Claim 7 is allowed and claim 10 was only objected to. There is no further comment on either claim.

In this Amendment claim 1 is amended consistent with the disclosure of the patent application. In claim 1, where formerly reference was made to an open-ended range for the coupling coefficient  $\kappa_2$ , reference is now made to a closed range of values of the coupling coefficient  $\kappa_1$ . This amendment is supported in the original disclosure from page 5, line 15 through page 6, line 16 and Figure 2, to which the cited passage of the specification relates.

As described in the specification, within the specified range, the coupling coefficient  $\kappa_1$  and the threshold gain difference,  $\Delta g_{th}$ , are relatively stable, meaning that the axial mode operation of the semiconductor laser that is claimed is, itself, stable. As pointed out in lines 9 and 10 of page 6 of the specification, this characteristic differentiates the claimed semiconductor laser from prior art semiconductor lasers.

New claim 11 preserves the limitation of claim 1 that is removed in the foregoing Amendment.

Claim 1 is the sole rejected independent claim. Claims 1 and 8 were rejected as unpatentable over Abe et al. (U.S. Patent 5,020,072, hereinafter Abe) in view of Lo (U.S. Patent 5,617,436) and further in view of a non-patent literature publication to Lu. This rejection is respectfully traversed as to the claim 1 and its dependent claims as now presented.

In characterizing Abe in the Office Action, the Examiner acknowledged that Abe does not teach coupling coefficients having values within the range of the values

specified in former claim 1 and, therefore, cannot supply the substitute limitation appearing in amended claim 1.

Lu was cited for an entirely different proposition unrelated to the claim amendment, in the former Office Action. There is no reliance upon Lu for the specified range of the first coupling coefficient.

As already pointed out, Lo is an inapposite reference for modifying Abe and Lu. There is no motivation, contrary to the assertion of the Office Action, for the cobbling together of Abe, Lo, and Lu. In other words, even if the selected parts of those references cited in the rejection meet various limitations of the claims, *prima facie* obviousness cannot be established unless there is a motivation to combine those publications in the way hypothesized by the Examiner. That motivation is lacking.

Fundamentally, Applicants do not quarrel with the characterization of Abe that appears at pages 4 and 5 of the previous Office Action. However, contrary to the assertion of that Office Action, the attempted establishment of *prima facie* obviousness breaks down when it is attempted to modify Abe with Lo. Lo is directed to a substantially different kind of semiconductor laser from Abe. Therefore, Lo cannot suggest modification of the laser structure described by Abe.

Abe, like the invention, is directed to a semiconductor laser that includes opposing facets or end surfaces defining a resonator and through which light produced within the semiconductor laser escapes for use outside the laser. Lo was cited as describing semiconductor lasers with remarkably high coupling coefficients. However, Lo can only achieve those coupling coefficients by constructing an active layer that includes a strained multiple quantum well structure in a surface emitting laser (SEL).

By way of explanation, referring to Figure 1 of Lo, on which the Examiner relied, the Lo semiconductor laser structure includes parallel vertical surfaces that might be considered to correspond to the end surfaces the semiconductor laser as described by claim 1. However, because the structure illustrated in Lo is an SEL, the light emission from that structure appears along the arrow 32 shown in that Figure 1

of Lo. See Lo at column 7, lines 37-42. Unlike the semiconductor laser of Abe and the claimed invention, that arrow 32 does not show light generated as exiting through one of the end surfaces.

Lo discusses the semiconductor laser structure described solely in terms of surface emitting lasers. See, for example, the paragraph beginning in column 5, line 46 of Lo and the particular reference to the inverse relationship between the coupling coefficient and the length of a cavity in an SEL. Further, all of the embodiments that are alternatives to the embodiment of Figure 1 of Lo are described by Lo as SELs. The considerations that pertain to the design and operation of SELs simply do not apply to the kind of semiconductor laser disclosed in Abe and disclosed and claimed in the present patent application. In those lasers the resonator is defined by the same first and second end surfaces through which light generated within the semiconductor laser is emitted. Therefore, one cannot simply extract various quantitative operational characteristics of Lo, e.g., coupling coefficients, and insert them into Abe. In other words, motivation for modifying Abe with Lo has not been established, meaning the *prima facie* obviousness, which here relies upon Lo, has not been established. Therefore, the rejections of claim 1 should be withdrawn. Further, upon reconsideration, Lo should be withdrawn as a reference.

Since Lo is an essential part of the rejections of claims 1 and 8, and of the other rejections of all other rejected claims, upon withdrawal of that patent, all of the other rejections likewise fail. For that reason, it is not necessary to discuss further any of the former or potential rejections of claims 3, 6, and 8-11.

Reconsideration and allowance of claims 1, 3, 6, and 8-11, in addition to the previous allowance of claim 7, are earnestly solicited.

Respectfully submitted,



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